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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,892	01/29/2004	Koji Ishizuka	2018-838	2310

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EXAMINER	
MILLER, CARL STUART	
ART UNIT	PAPER NUMBER
3747	
MAIL DATE	DELIVERY MODE
04/10/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/765,892	ISHIZUKA ET AL.	
	Examiner	Art Unit	
	Carl S. Miller	3747	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/14/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, in reviewing the applicant's arguments the examiner has reexamined the specification and has determined that part of the confusion regarding the applicability of the reference against the claims lies in the fact that the claims do not clearly reflect the invention. The claims, as currently written, imply that the injection timing is set based upon the geometry of the injection rate. This is not the case. The applicant is instead setting a correction for the injection control signal based upon the actual quantity being produced as represented by the geometry of the rate. For this reason, the examiner suggests that all of the independent claims be amended to state that the drive signal determined is for - - an injector control signal - - and not "the injector" as currently claimed in line 10 of Claim 1. It is the control signal timing that is being set based upon the injection rate and not the actual timing for the opening of the injector. For example, Figures 1 and 2 of the applicant's disclosure show that the needle lift does not coincide with the control signal and a similar result is true in Figure 4 of Crofts.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Crofts ('533).

In particular, the applicant's attention is directed to Figure 4 and the description of this figure found in paragraphs [0036] through [0038] of the disclosure. More specifically, the applicant's attention is directed to lines 33-38 of paragraph [0036] and lines 13-18 of paragraph [0037]. These lines clearly indicate that the beginning and ending of the control signal is determined from the geometry of the injection rate as indicated by the lift sensor. The noted paragraph [0036] also states that the delay times for each feedback cycle are stored and then used in the next injection cycle. In order to use these variations, it would have been obvious to store them as learned values (if not inherent).

Since Crofts states that he uses lift sensor feedback to control fuel metering it would have been obvious for him to monitor fuel pressure and know flow areas for the needle in order to know the quantity of fuel produced based upon the needle lift. The use of these parameters would have been obvious as well in the calculation of injection rates. The latter calculation by Crofts is further implied by the cited paragraphs. Finally, a multi-sided geometry of for the injection rate would have necessarily resulted from the multi-sided lift of the injection needle.

It would have been obvious to use the known injection rate geometry to calculate the actual injection quantity and to adjust the **control signal** timing to produce the desired **injection period** because this would have been an obvious way to

compensate for unexpected injection delays and would have been one of the obvious ways to control the control signal timing as suggested by the Crofts disclosure.

Applicant's arguments filed February 13, 2008 have been fully considered but they are not persuasive. In particular, although the applicant does not argue the issue of a multi-sided geometry for the injection rate, the examiner notes that assuming a constant geometry of the needle and injector and d a constant pressure for the fuel, the geometry of the rate would follow that of the lift just as it does in applicant's Figures 1 and 2. Even if the pressure were to vary somewhat during the injection, the geometry would still be multi-sided as required by the claims.

Secondly, as noted in the rejection above, the applicant is using a quantity determined from the injection rate area to determine a corrected control signal timing and this type of needle position feedback is implied in Crofts.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carl S. Miller whose telephone number is 571-272-4849. The examiner can normally be reached on MTWTHF.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve Cronin, can be reached on 571-272-4536. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Carl S. Miller/
Primary Examiner
Art Unit 3747